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RELIGION AND BODY WEIGHT IN AN UNDERSERVED POPULATION*

Karen H. Kim Yeary, Chan-hee Jo, Pippa Simpson, Jeffrey M. Gossett, Glenda Stein Johnson, Beverly J. McCabe-Sellers, Alma Thornton, Elaine Prewitt, and **Bernestine B. McGee**

Abstract: Excess body weight is a prominent public health problem, with underserved groups bearing a disproportionate burden of disease (Ogden et al., 2006; Association AH, 2005; Hartley, 2004). Understanding body weight through examining potential predictors is an important step in addressing the current obesity epidemic. A potential predictor that has not been thoroughly examined in relationship to body weight is religion. Americans are very religious (Gallup Poll GP, 2001; Worldwide DN, 2000), with certain underserved subgroups of the population reporting greater religiosity than others. Those living in the rural South and African Americans report higher rates of church attendance and membership (Scandrett, 1996). Religion's prominence in some underserved groups that bear a disproportionate burden of the obesity epidemic may play an important role in determining body weight. Data from FOODS 2000, a representative sample of a rural, impoverished area in the lower Mississippi Delta region of the US, were analyzed (total n=1606; 787 African American and 819 Caucasian adults aged 18+). Religion was hypothesized to be associated with higher body weight; with the relationship being more pronounced in African Americans than Whites. Health behaviors (smoking, nutrition, physical activity) were expected to mediate the relationship. In Whites only, those consuming religious media at least once a week or more were 1.37 BMI units heavier than those consuming religious media less than once a week. Smoking mediated this relationship. There were no significant relationships between religion and body weight in African Americans.

Keywords: religion; spirituality; body weight; obesity; health disparities

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Karen H. Kim Yeary is an Assistant Professor in the Department of Health Behavior and Health Education at the University of Arkansas for Medical Sciences.

Dr. Yeary conducts translational research with underserved populations to prevent chronic disease through community-based, behavioral interventions.
Address: Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, 4301 West Markham #820, Little Rock, AR 72202. Ph.: (501) 526-6720, Fax: (501) 526-6709, Email: khk@uams.edu

Chan-hee Jo, UAMS/ACH, 1120 Marshall St, Slot 512-43, Little Rock, AR 72202. Email: JoChanhee@uams.edu

Pippa Simpson, Medical College of Wisconsin, Quantitative Health Sciences Translational and Biomedical Center Children's Research Institute, 8701 Watertown Plank RoadMilwaukee, WI 53226-4801. Email: Psimpson@mcw.edu

Jeffrey M. Gossett, UAMS/ACH, 1120 Marshall St, Slot 512-43, Little Rock, AR 72202. Email: GossettJefferyM@uams.edu

Glenda Stein Johnson, Southern University and A&M College Ashford O. Williams HallPost Office Box 100010. Baton Rouge, LA 70813. Email: glenda_johnson@suagcenter.com

Beverly J. McCabe-Sellers,900 S. Shackleford Rd., Suite 509, Little Rock, AR, 72211. Email: Bev.McCabe-Sellers@ars.usda.gov

Alma Thornton, Center for Social Research at Southern University and A&M College, Baton Rouge, LA. Email: alma_thornton@subr.edu

Elaine Prewitt, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, 4301 West Markham #820, Little Rock, AR 72202 Email: TPrewitt@uams.edu

Bernestine McGee, Human Nutrition and Food Program, Southern University and A&M College, Baton Rouge, LA. Email: Bernestine_mcgee@subr.edu

Corresponding author: Karen H. Kim Yeary.

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Excess body weight is a prominent public health problem. Related to excess death (Flegal, Graubard, Williamson, & Gail, 2005) and numerous chronic diseases (Flegal, Carroll, Ogden, & Johnson, 2002), obesity and overweight are prevalent in 66% of US adults (Ogden et al., 2006). Thus efforts to understand the etiology of obesity are paramount, particularly for subgroups of the population (some minorities, rural, poor) that suffer a disproportionate burden of disease (Association AH, 2005; Hartley, 2004;

In a subsequent phone call, participants answered questions on food security (US Food Security questionnaire), household income, household participation in nutritional assistance programs, dietary habits, and religiosity information.

The sample includes 1662 respondents who completed the entire telephone survey; 1662 were weighted to represent the entire LMD. We restricted our sample to adults 18 years of age or older who reported race as either white or black. This reduced our sample size from 1662 to 1606. Due to missing data on some risk factors, the sample size is further reduced in some analyses (i.e. particularly the regression analyses).

The data collected in FOODS 2000 was weighted to adjust for nonresponse at several levels. Data were adjusted for telephone numbers with unknown eligibility, unknown residency, and for refusal to participate.

For the current analysis, the sample is representative of African American and Caucasian adults aged 18 and older of the LMD population. The sample for this study consisted of 1606 adults (Black n=787; White n=819).

Independent Variables

Religion is a complex, multidimensional construct, and there is little consensus about how religion should be conceptualized and measured. Prior literature (Kim, Sobal, & Wethington, 2003a) was considered in deciding how religion was conceptualized in the present study. The FOODS 2000 survey contained 7 religion questions pertaining to denomination, religious attendance, religious importance, religious media, and prayer.

Denomination questions asked respondents what their religious preference was among Protestant, Catholic, Jewish, Muslim, Other, or None. A follow-up question asked about specific denomination and included choices: Baptist, Methodist, Pentecostal, Nazarene, Other, and Don't Know. Denominations were collapsed to maximize a meaningful interpretation of denomination's possible relationship with body weight. The largest religious group in the LMD area is the Southern Baptist Convention (Jones, Doty, Grammichi, et al., 2002), with approximately 60% (n=1662) of the sample reporting a Baptist affiliation. Thus, given the predominance of those in our sample indicating a Baptist affiliation, religious denomination for this analysis was grouped into Baptist or Other.

Religious attendance is a standard component of religiosity that is often analyzed (De Vaus & McAllister, 1987). FOODS 2000 respondents were asked to choose from 7 categories (never, daily, two or more times per week, once a week, two or three times a month, once a month, less than once a month) describing how often they attend religious or spiritual services. Response categories were collapsed to produce a dichotomous variable of religious attendance: attends at least once a

week vs. attends less than once a week. Attending religious services at least once a week or more was designated as high religious attendance.

Religious importance was assessed by asking respondents how important their religious beliefs were to them using four categories: "Very Important", "Fairly Important", "Not too Important", and "Not at all Important". A dichotomous variable was created dividing those indicating that their religious beliefs were "Very Important" versus those indicating otherwise.

Religious media was a dichotomous measure constructed from averaging two single-item categorical variables. Questions included, "How often do you listen to religious radio?" and "How often do you watch religious television?" Responses ranged from 'less than once a month' to 'daily'. High religious media indicated listening or watching religious media at least once a week.

Prayer was assessed by asking respondents how often they prayed, with responses ranging from daily to less than once a month. A dichotomous variable was created, with those indicating praying daily vs. those praying less than daily.

Dependent Variable

Weight and height were self-reported in the questionnaire and used to calculate Body Mass Index (BMI). The accuracy of self-reported weight and height is generally seen as adequate for survey research (Stewart, 1982; Stunkard & Albaum, 1981). Excluding the cases with missing values and implausible outliers, the total BMI sample size available for the weighted analysis was 1582.

Demographic and Control Variables

Demographics of gender, age, race/ethnicity, education, income were assessed (Sobal, 2001). Education was categorized as less than high school education, and greater than high school education. Income was categorized into three categories: $0-$14,999, $15,000-$29,999, and $30,000+. Age was coded as a continuous variable.

Physical functioning was assessed as a continuous variable as the physical component of the 12-item Short Form Health Survey (SF-12) (Ware, Kosinski, & Keller, 1996). An example question is, "During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health: accomplished less than you would like?" Previous studies have reported Cronbach alphas of 0.72 and 0.89 (Resnick & Parker, 2001). Higher scores indicated higher physical functioning.

Health Behavior Variables

Physical activity was measured using a validated single-item question from

Table 1: *Summary Statistics for Variables used in the Analysis*

Variable		Prevalence (N) Or Mean/SE of Mean
Black		45% (806)
Female		54% (1019)
Household Income	$0-$14,999	26% (480)
	$15,000-$29,999	25% (410)
	$30,000+	42% (603)
Age		Mean=45.1, SE=0.3
Education	Less than high school	24% (402)
	Greater than high school	74% (1184)
Physical Functioning		Mean=49.1, SD=0.3
Denomination	Baptist	58% (974)
	Other	42% (634)
Religious	Once a week or more	59% (970)
Attendance	Less than once a week	41% (635)
Religious	Very important	81% (1328)
Importance	Other	19% (274)
Prayer	Daily	82% (1352)
	Less than daily	18% (243)
Religious Radio/TV at least once per week	At least once a week	60% (1040)
	Less than once a week	40% (568)
Religious Books	At least once a week	60% (1016)
	Less than once a week	40% (592)
Smoking	Never	57% (936)
	Current	24% (362)
	Former	18% (297)
Regularly Exercised	Yes	70% (1067)
	No	30% (541)
Total Fat (grams)		Mean=79.0, SE=1.3
Total Calories (kcal)		Mean=2001.1, SE=25.3
Obesity		34% (556)
BMI		Mean=28.3, SE=0.2

Table 3: *Regression of Religion on Body Mass Index (BMI) in Caucasians*[1]

	Model 1 controlling for demographics[2]	**Model 2** controlling for demographics + smoking	**Model 3** controlling for demographics + smoking + physical activity	**Model 4** controlling for demographics + smoking + physical activity +nutrition
Religion Variable				
Denomination (Baptist vs. Other)	.65 (0.50)	.87 (0.49)	.82 (0.47)	.89 (0.47)
Religious Importance (Very important vs. Other)	1.38 (0.70)	1.15 (0.67)	1.18 (0.65)	1.22 (0.66)
Religious Attendance (At least once a week or more vs. Other)	.69 (0.45)	.16 (0.41)	.30 (0.40)	.30 (0.40)
Prayer (Daily vs. Other)	-.08 (0.64)	-.40 (0.64)	-.42 (0.63)	-.44 (0.63)
Religious Media (At least once a week or more vs. Other)	1.37 (0.61)*	1.28 (0.60)*	.77 (0.75)*	1.37 (0.58)*

** p<.01 * p< .05

[1]Cells of the table represent unstandardized regression coefficients (standards errors).

[2]Demographics controlled for included gender, age, education, and physical functioning

DISCUSSION

This study expands upon previous studies on religion and body weight by assessing the religion-body weight connection in an under-served population. Consistent with previous studies on religion and body weight (Ferraro, 1998; Kim, Sobal, & Wethington, 2003b), greater reported religiosity was associated with higher BMI in Whites, with every 1.0 unit increase in religious media consumption (watching religious TV or listening to religious radio) being associated with a 1.37 unit increase in BMI (~7 pounds). These relationships accounted for gender, age, education, income, and physical functioning. Also consistent with a previous study on religion and body weight (Kim, Sobal, & Wethington, 2003a), the relationship between religion and BMI in Whites was mediated in part by smoking. Physical activity and nutrition did not appear to be mediators in the relationship between religious media and BMI in Whites. There were no significant relationships between religion and body weight in African Americans.

Religion's relationship with higher body weight appears to be a consistent finding across both national and underserved samples in Whites only. To the authors' knowledge, this is the first study to specifically examine religion's relationship with body weight in African Americans. In African Americans of a rural, underserved population, religion does not appear to play a role in body weight. It is unclear why religion would not be associated with body weight in African Americans. Given the higher levels of religiosity among African Americans, there may have not been enough variance in the religion measures to assess significant relationships between religion and body weight; however the levels of religiosity were high among the Whites in our sample as well. There may have also not been enough power in our sample, although an n of 787 seems adequate. Historically, the black church has served as a central role in African American communities, and continues to be an influential force in the lives of many African Americans today (Eng & Hatch, 1991; Eng, Hatch, & Callan, 1985). The role of the black church in African American history may have cultivated a unique African American religiousness that is not unrelated to body weight, or not adequately captured by the study's measures.

In addition to testing religion's relationship with body weight in African Americans, this study expands upon previous studies in religion and body weight by assessing physical activity and nutrition as mediators in the relationship. In addition to the lower rates of smoking among the more religious, religion's relationship with higher body weight may be due to lower physical activity or differential dietary intake. More specifically, significant relationships between religious media and higher body weight may reflect more the physical inactivity of the religious, where religious media is a proxy for physical inactivity. However, our findings suggest that the higher body weight associated with higher religious media consumption was not due to lower physical activity. Energy and fat intake were also not mediators in the relationship, which lends evidence against religion leading to a higher energy and fat intake that contributes to weight gain. It is

unclear, then, how religious media is related to higher body weight. The activity and nutrition measures may not have been sufficiently detailed to capture the full variance of physical activity and nutrition in the sample. Given that our sample was an older one, the higher religious media and body weight may be indicative of homebound or disabled participants that were not able to regularly attend church services. However, our control of physical functioning in the analysis would have accounted for this possibility to some extent.

There are several limitations in this study. Due to the cross-sectional nature of the data, it is not possible to determine causal relationships. In addition, self-reported data may have some bias or non random measurement errors involved. Despite these limitations, however, this study expands our knowledge of the relationship between religion and body weight in a previously overlooked sample, and extends our understanding of how religion may be related to body weight. In a rural, poor, predominately minority population, religion (religious media) is related to higher body weight in Whites. Social contexts, such as religion, play an important role in how health and health behaviors are shaped. Given that religion plays a significant role in several marginalized populations that suffer a disproportionate burden of disease, better understanding this aspect of the social realm is important in understanding body weight and disparities in health.

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